November 21, 1983

CD-83-16 (HD)

Dear Gasoline-Fueled Heavy-Duty Vehicle Manufacturer:

Enclosed are instructions for the preparation and submission of applications for 1985 model year gasoline-fueled heavy-duty vehicle certificates of conformity. The instructions provide guidance regarding the documentation of compliance with the 1985 model year evaporative standards which are specified in 40 CFR 86.085-10(b). The information which must be submitted in an application is specified and the format in which it should be presented to expedite the review process is described in detail. The use of the enclosed instructions is optional. Any application which includes all of the required information will be accepted.

The enclosed instructions are patterned after those that have been previously issued to provide guidance regarding the pre- paration of applications for 1984 model year heavy-duty engine certificates. Several unused application sections have been reserved to maintain a common section numbering system. The appendix to the instructions explains how standardized family names are generated and provides suggested forms for the presentation of production parameters and essential certifica- tion information. The suggested certification information form is designed to facilitate the input of the submitted data into the EPA computer data base and should be used without modification.

The information which is specified in the enclosed instructions does not include all of the data or records which are specified in 40 CFR, Part 86, Subparts A and M. The information which is not requested must be maintained in the applicant's files to be provided to EPA upon the receipt of a specific request. The information which is submitted in the application must be kept up-to-date during the associated production period by the submission of the appropriate revised pages.

The 1985 evaporative standards and procedures are the first emission related regulatory requirements to be promulgated for heavy-duty vehicles. Consequently, the enclosed instructions involve some assumptions regarding the most useful application form and content. If the need for changes becomes apparent, revised pages which implement the appropriate alterations will be made available. We invite manufacturers' suggestions for future improvements to the form and content of the instructions.

Any questions or comments regarding these instructions should be directed to Mr. J. Bozek at (313) 668-4244 or Mr. T. Snyder at (313) 668-4442.

Sincerely yours,

Robert E. Maxwell, Director
Certification Division
Office of Mobile Sources

INSTRUCTIONS

FOR THE

PREPARATION AND SUBMISSION

OF

APPLICATIONS FOR CERTIFICATES OF CONFORMITY

FOR

1985 MODEL YEAR GASOLINE FUELED HEAVY-DUTY VEHICLES

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF MOBILE SOURCES
DIVISION OF CERTIFICATION
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TABLE OF CONTENTS

Chapter 1

Introduction

The purpose of these instructions is to provide guidance regarding the preparation, submission, and revision of applications for certificates of conformity to the Federal regulations which govern evaporative emissions from 1985 and later model year gasoline-fueled heavy-duty vehicles. Detailed specifications regarding the information which must be provided and suggestions concerning the organization and submission of this information are presented.

An application which is prepared in accordance with these instructions is EPA's principal source of information regarding the product line which is to be certified. This information provides the primary basis for the determination of compliance with emission control regulations. Therefore, the application must be complete and accurate when it is submitted. After it is submitted, it needs to be kept current by the submission of the necessary updating material.

The information specified in these instructions does not include all of the data and records which are specified in 40 CFR, Part 86. The material which is not specified in the instructions must be retained in the applicants' files to be provided to EPA upon the receipt of a specific request.

Chapter 2

General Instructions

This chapter provides general instructions regarding the preparation, submission, and revision of an application.

2.1 Letter of Intent

Under the certification protocol which will be implemented for the 1985 model year, the application for a certificate of conformity is not submitted until all phases of the certification program, including all testing, have been completed. This protocol impairs EPA's ability to set up schedules and formulate plans which will help facilitate a timely response to the applicant's requests for

assistance and approval. Therefore, the applicant is encouraged to submit a letter of intent to EPA before the application is submitted. The basic information relating to each evaporative emission family to be certified, such as the identifying family name, the anticipated date when the request for a certificate will be submitted, and the Job 1 date should be submitted as soon as possible. The inclusion of any other general information, is recommended. The submittal of such a letter of intent should not be delayed until all information is completely finalized. Best estimates, when finalized data are not available, can be used. However, if significant changes in the anticipated certification program, such as the deletion or addition of an evaporative emission family, are made after the submission of a letter of intent, a letter which updates the previously submitted information should be forwarded to EPA.

2.2 Terminology

Certain terms contained in the application instructions have unique connotations to assist applicants in meeting EPA's requirements for information. These unique connotations are defined in 40 CFR Part 86.

2.3 Structure of the Application

A specific application format is recommend in these instructions. However, any logical comprehensive presentation of the information specified in these instructions is acceptable.

The recommended structure of the 1985 model year application is divided into the following sections:

1. Communications
2. Statement of Confidentially
3. [Reserved]
4. [Reserved]
5. [Reserved]
6. Maintenance and Warranty
7. Labeling
8. General Technical Description
9. Evaporative Emission Family Description
10. [Reserved]
11. [Reserved]
12. [Reserved]

13. [Reserved]
14. [Reserved]
15. [Reserved]
16. Request for Certificate

Chapter 3 of these instructions specifies the precise contents of each of these sections.

The division of the application into sections reflects the fact that the elements of information within the application vary widely in their relevance and applicability to the applicant's product line or certification program as a whole. The data required by Section 9 (Evaporative Emission Family Descriptions), for example applies to a single evaporative emission family; a description of a fuel tank in Section 8 (General Technical Description) would pertain to all evaporative emission family/evaporative emission control system combinations that would be equipped with that fuel tank during a particular model year; the discussion of Maintenance and Warranty (Section 6) would apply to the applicant's entire certification program and product line for one model year. The suggested format groups together in Sections 1 through 8 the "general" information that applies broadly to the entire product line or certification effort; Sections 9 through 15 provide information which are specific to particular evaporative emission family; Section 16 is a summary of the data required to substantiate that the new vehicle comply with Federal emission standards (Ref: 40 CFR 86.085-10).

2.4 Size and Form of the Application

All applications should be presented on 8-1/2 inch by 11 inch paper, or a reasonable equivalent, and be bound in a looseleaf cover of the same approximate size. Divider pages should be used to separate the recommended application sections from one another.

2.5 Referencing

Referencing permits a reduction in the size of the application by minimizing duplication and redundancy. In many of the applications that were submitted in previous model years, identical information which was applicable to several engine families was reproduced in several different places. "Referencing" makes use of a single description to cover all instances within the application where that information may be necessary to eliminate such needless repetition.

Applicants are encouraged to reduce duplication by referring to the

location of a unit of information's first submission whenever access to that information is required, rather than needlessly reproducing identical data. In essence, the concept of referencing reduces paperwork by encouraging the applicant to submit a unit of information only once for each model year.

Applicants should be wary, however, of applying the referencing concept too freely and producing an application whose every page is a bewildering network of allusions to other pages of the application. Such overuse of referencing would generate a document that, although free of repetition, could not be reviewed without large amounts of inefficient crosschecking and page-turning. Applicants should consequently exercise good judgment to prevent taking the referencing concept to unproductive extremes.

2.6 Page Numbering

Each page number should include the respective section number, e.g., 02-2 (section 02.00.00.00 -page 2), 08.01.01-15 (section 08.01.01.00 -page 15), 06.01-9 (section 06.01.00.00 -page 9). The detail of the indexing system which is used in page numbering should be based upon the amount of information contained in a given section. In section 02.00.00.00, there is not a large enough volume of information to support a finer breakdown; however, in section 08.01.00.00 there may be many pages of fuel tank descriptions as well as fuel cap descriptions so it may be appropriate to use three levels of indexing in the page number (even four may be appropriate if there are a number of fuel tanks to describe). It is up to the applicant to decide what type of detail is appropriate for his application. Some provision, such as the use of decimal numbers, should be made for adding a new page with new or supplemental data without disturbing the numbering of the other pages in a particular section, e.g., 02-2.1.

For sections that are specific to a particular evaporative emission family (e.g., 09.00.00.00, 16.00.00.00), the page numbering system should include the name of the appropriate evaporative emission family to avoid confusion in handling many pages of similar format, e.g., 09-FHC0493GAA8 (for evaporative family FHC0493GAAB). For

purposes of page numbering, the standardized evaporative emission family name (see Appendix pages 1-9) may be abbreviated by deleting the model year and manufacturer characters, which would be common to all of a manufacturer's evaporative emission families for a given model year, and the check-sum digit, e.g., 09-493GAA-2. Further

abbreviation is permissible as long as the resulting designation is sufficient to identify the evaporative emission family uniquely within the application. If fuel tank volume and the "uniqueness digits" constitute a distinctive abbreviation for the family name, for instance, then 09-493A would be an adequate page number. Applicants who wish to use abbreviated family names shorter than seven characters should clearly indicate on the divider page that precedes the evaporative emission family information the abbreviation to be used; all such abbreviations should be summarized in a table at the beginning of Section 09.00.00.00).

2.7 Indexing

The format recommended in these instructions assigns a unique eight-digit code to every element or unit of certification data contained within the application. Each code consists of four two-digit pairs, such as 09.03.01.01, with each successive pair indicating a more precise and specific level of description. Hence, in this example, the 09 refers to evaporative emission family descriptions; the 03 refers to the individual control system parameters; the 01 refers to fuel tank; and the 01 refers to maximum nominal fuel tank capacity.

The table on pages 2-5 and 2-6 sets forth codes which can be used within an application for certification. Some of these codes include two-digit pairs whose value is double zero (00, as in fuel tank--08.01.00.00). The presence of the double zero pair indicates that one available level of the indexing scheme has not been assigned by EPA. Designations at this level can and should be assigned by applicants, however, if distinctions at this level of precision need to be drawn. If an applicant needs to provide general technical descriptions of two kinds of fuel tanks, for example, the pertinent sections of the application could be labeled 08.01.01.00 and 08.01.02.00.

All submissions of certification data, should be structured according to the indexing order outlined below. Page numbers should also reflect this order, as is specified in Subpart 6 of this Chapter on page numbering. It is not strictly necessary to tag information within the pages of the application with their corresponding codes, if it is always clear what kind or element of data is being presented or described.

Section Number	Sequence Number	Title
01.00.00.00		COMMUNICATIONS
.01.00.00		Mailing Information
.01.00		Technical Representatives
.02.00		Advisory Circulars and Other Technical Information
.03.00		Certificate of Conformity
02.00.00.00		STATEMENT OF CONFIDENTIALITY
03.00.00.00		RESERVED
04.00.00.00		RESERVED
05.00.00.00		RESERVED
06.00.00.00		MAINTENANCE AND WARRANTY
.01.00.00		Owner's Manuals
.02.00.00		Shop Manuals
.03.00.00		Technical Service Bulletins
.04.00.00		Emission System Warranty Statement
07.00.00.00		LABELING
08.00.00.00		GENERAL TECHNICAL DESCRIPTION
.01.00.00		Fuel Tank
.02.00.00		Storage Device
.03.00.00		Purge System
.04.00.00		Carburetor
.05.00.00		Air Cleaner
.06.00.00		Auxiliary Emission Control Devices
.07.00.00		Evaporative Control System Configuration
09.00.00.00		EVAPORATIVE EMISSION FAMILY DESCRIPTIONS (See Chapter 3 on preparing the application for the contents of this section)
10.00.00.00		RESERVED
11.00.00.00		RESERVED

12.00.00.00 RESERVED

13.00.00.00 RESERVED

14.00.00.00 RESERVED

15.00.00.00 RESERVED

16.00.00.00 REQUEST FOR CERTIFICATE
- .01.00.00 Statement of Compliance
- .02.00.00 Reserved
- .03.00.00 Certification Information
- .04.00.00 Certificate Information
- .05.00.00 Production Engine Parameters
  - .01.00 Parts List
  - .02.00 Production Tolerances
  - .03.00 Quality Control Information

2.8 Standardized Family Names

Applicants are strongly encouraged to use the standardized evaporative family naming system which is illustrated on Appendix pages 1-7.

2.9 Submitting the Application

Submission of the application is made after testing if any, is completed and the application is in final form. One copy should be forwarded with a letter of transmittal to:

Director Certification Division
Office of Mobile Sources
U.S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, Michigan 48105

A duplicate copy of the application should be forwarded to:

Director
Manufacturers Operations Division (EN-340)

U.S. Environmental Protection Agency
401 M. Street, S. W.
Washington, D. C. 20460

2.10 Revising the Application

After the application has been submitted, revisions may become necessary. The material which needs to be submitted depends upon whether or not a revision involves a product line change that may have an effect on emissions.

If a revision merely corrects an error or omission and does not involve a product line change which may have an affect on emissions, only a brief description or explanation of the revision and the revised application pages are submitted.

If a revision involves a product line change which may have an affect on emissions, a Certificate Change Request must be submitted which includes a description of the revision and the revised application pages.

Many applicants in the past have followed a practice of identifying successive running changes with a number which includes the family designation and model year of the vehicle being affected. (For example, the number of the first running change in the 1985 model year for the ABC family might be 85-ABC-01). This practice has proved to be quite useful and is highly recommended.

Each page of the application should include a revision block which provides space for the date of issue as well as the effective date of each revision.

Revision No

Revision Date

Chapter 3

Preparing the Application

This chapter presents recommendations for preparing the sections of

the application for certification in a manner that will ensure that the needs of EPA will be met. Careful adherence to these recommendations and the submission of all required data will greatly expedite the review process.

3.1 Communications (Section 01.00.00.00)

This section of the application should contain information concerning:

(a) Routine Communications

The names, addresses, and telephone numbers of all technical representatives who are authorized to communicate with EPA should be provided.

(b) Receipt of Advisory Circulars and Other Technical Information

The name and address of the representative who is to receive the information should be provided. If the information is normally received through some organization (e.g., Engine Manufacturers Association), the fact should be noted so that unnecessary duplicate distribution can be avoided. If the information is to be picked up by couriers rather than mailed, this fact should be noted.

(c) Receipt of Certificates of Conformity

The name and address of the representative who is to receive the certificate should be provided.

3.2 Statement of Business Confidentiality (Section 02.00.00.00)

section 208(b) of the Clean Air Act requires (1) the Administrator to disclose to the public all non-trade secret information and keep trade secret information confidential and (2) the person who has submitted the information claimed to be confidential to make a satisfactory showing that the information in question would divulge trade secrets, if disclosed. If an applicant falls to make a claim the information in the application may be made available to the public without further notice to the applicant.

Confidentiality claims and substantiating information are to be included with the data for which confidential status is requested at the time of submission to EPA. For information for which

confidential treatment is desired, the following questions need to be addressed:

1. which information in the application for certification is considered to be entitled to confidential treatment until model introduction?

2. Which information in the application for certification is considered to be entitled to continuing confidential treatment after model introduction?

3. To what extent has the information been disclosed to others, and what precautions were taken with respect to these disclosures?

4. Is the information available to the public through legitimate means?

5. Can the information be derived from a detailed engineering inspection of the motor vehicle model in question or from information already public once the model is offered for public sale?

6. Would disclosure of the information be likely to result in substantial harm to the applicants competitive position? If so, a detailed discussion regarding what the harmful effects would be, why the effects would be substantial, and the nature of the casual relationship between disclosure and the harmful effects must be presented.

Complete answers to these questions must be supplied for all information which is claimed to be confidential. The EPA General Counsel will make a final determination on the claim partly on the supporting data which are provided.

Information which is submitted in substantiation of a confidentiality claim may be claimed to be confidential in its own right. If the information pertains to the confidentiality claim, is not otherwise possessed by EPA, and is marked, when received by EPA, as "trade secret," "proprietary," or "company confidential," it will not be disclosed by EPA without the applicant's consent unless disclosure is ordered by a Federal court. If no claim accompanies this substantiation information when it is received by EPA, it may be made available to the public without further notice to the applicant.

To facilitate reproduction for release purposes, trade secret information should not be included on the same page as information

which is available for public release. Also pages containing trade secret information should be clearly identified as "TRADE SECRET," "PROPRIETARY," OR "CONFIDENTIAL."

3.3 Reserved (Section 03.00.00.00)

3.4 Reserved (Section 04.00.00.00)

3.5 Reserved (Section 05.00.00.00)

3.6 Maintenance and Warranty (Section 06.00.00.00)

At the time of issuance, all explanations regarding the use, repair, adjustment, maintenance, or testing of a vehicle relevant to the control of evaporative emissions issued by the manufacturer for use by other manufacturers, assembly plants, distributors, dealers, and ultimate purchasers. This requirement can be met by forwarding to EPA shop maintenance manuals, technical service bulletins, and vehicle owner's manuals. [Ref: 40 CFR 86.078-7(b)]

In addition to this information, the emission system warranty which will be provided to the ultimate purchaser is to be submitted to EPA.

Two copies of each of these items must be submitted, one to the Certification Division in Ann Arbor and one to the Manufacturers Operations Division in Washington, D.C.

3.7 Label Format (Section 07.00.00.00)

A copy of each label (either the actual label, a photograph, or a drawing) to be used to comply with 40 CFR 86.085-35 must be submitted. A photograph or a written description of the location of the label on the vehicle for each model certified must also be submitted.

3.8 General Technical Description (Section 08.00.00.00)

This section should be a reference book for Section 09.00.00.00.

Whenever an explanation greater than a few words or a line is required in this section. a narrative explanation should be contained in Section 08.00.00.00. Similarly, whenever the configuration of a component needs to be shown, the drawing or schematic can be presented in Section 08.00.00.00.

Information, such as a storage device (Section 09.03.02.00) which may not differ within or among evaporative emission families, could appropriately be listed in Section 08.02.00.00 and then referenced for each family to eliminate duplication.

3.9 Evaporative Emission Family Description (Section 09.00.00.00)

The information submitted determines how the applicant's product line is subdivided into separate evaporative families.

When an application includes a number of evaporative families which share common characteristics, referencing should be used to avoid the submission of redundant information. The submission of much of this information may be eliminated by referencing a particular evaporative emission family. For example, if a manufacturer wishes to certify families A, B, and C, each of which differ by one or more parameters, the applicant can submit all the required information on evaporative emission family A and then submit a single page for evaporative emission families B and C with a statement stating that these families are identical to evaporative emission family A except for the listed differences.

This concept can be enlarged where certain sections of an evaporative emission family may be different but would benefit from the use of referencing. Discretion will have to be used, however, to insure that this procedure is used in cases where there are few enough differences to make it an effective tool.

Section Number	Title
09.01.00.00	Common family parameters
.01.00	Method of fuel air metering (i.e., carburetion versus fuel injection)

.02.00 Carburetor bowl fuel volume
.02.00.00 Common control system parameters
.01.00 Method of vapor storage
.02.00 Method of carburetor sealing
.03,00 Method of air cleaner sealing
.04.00 Vapor storage working capacity
.05.00 Number of storage devices
.06.00 Method of purging stored vapor
.07.00 Method of venting the carburetor
.08.00 Liquid fuel hose material
.09.00 Vapor storage material
,03,00.00 Individual control system parameters
.01.00 Fuel Tank
.01 Maximum nominal fuel tank capacity
.02 Description (include filler inlet, cap, relief valve, vents, and anything contained in the tank.

09.03.01.03 Calibration of any device on fuel tank such as vents on pressure relief valves
,04 Fuel tank material
.02.00 Storage device
.01 Description
.02 Calibration
,03,00 Purge-system
.01 Description
.02 Calibration
.04.00 Carburetor
.01 Description
.02 Calibration
,05,00 Air cleaner
.01 Description
.06.00 Auxiliary Emission Control Devices
.01 Descriptions
.02 Calibrations
.07.00 Total evaporative emission system configuration (include any environmental control mechanisms such as underhood fans.)

.08.00 Gross vehicle weight rating for the evaporative control system (Maximum/Minimum)

3.10 Reserved (Section 10.00.00.00)

3.11 Reserved (Section 11.00.00.00)

3.12 Reserved (Section 12.00.00.00)

3.13 Reserved (Section 13.00.00.00)

3.14 Reserved (Section 14.00.00.00)

3.15 Reserved (Section 15.00.00.00)

3.16 Request for Certificate (Section 16.00.00.00)

The application must provide the statements specified in 40 CFR 86.085-23(b)(3), 86.085-23(b)(4)(i), 86.085-23(b)(4)(ii), 86.085-23 (d), 86.085-23(e)(1), and 86.085-23(e)(2). Reference Advisory Circular No. 76 and 76-1.

The following information must be submitted for each engine family:

3.16.1 Reserved

3.16.2 Certification Information

The information which is required on pages 8 and 9 of the Appendix must be submitted. The exact form which is used on page 8 must be used to facilitate the inclusion of the information into EPA computer data base.

3.16.3 Certificate Information

The following information concerning the certificates or conformity needs to be provided:

a. The person to whom the certificates should be mailed.

b. The exact evaporative emission family designation to appear on the certificate.

3.16.4 Production Part Numbers

A list of production part numbers needs to be included. A sample form for the presentation of part numbers is shown on page 10 in the Appendix.

3.16.5 Production Parameters

Production calibration data (showing tolerance limits) need to be included for all calibrated components used in the evaporative emission control system which is available within the product line. Each set of data and calibration should be identified by:

a. Evaporative family
b. Evaporative system
c. Evaporative code

Each calibration and set of production tolerance limits shall also indicate (1) any differences from tolerance limits previously included in the application and (2) any special points at which all production pieces are checked and/or adjusted. Applicants should also indicate the percentage of production pieces checked and/or adjusted.

Describe sampling technique, i.e., how "production" tolerances are determined and how tolerance bands are used. For example, a 100 percent check, with rejection of all pieces outside of bands, a 2 percent audit of production, or a batch sampling technique.

For any production curve or calibration referenced in this section that is identical in all respects to an engineering curve OL calibration previously included in this application, reference to

the curve number and latest revision date in this section can be made in lieu of resubmitting the curve or calibration.

Alternatively, the applicant may provide an unqualified statement such as the following, defining the tolerances expected to apply to production vehicles:

> This application for certification identifies and describes those vehicles to be covered by the certificate(s) of conformity issued by EPA, and this application for certification covers only those new motor vehicles to be produced by (company name) which conform, in all material respects, to the design specifications (including tolerances) which are contained herein.

APPENDIX

Table of Contents

EPA STANDARDIZED EVAPORATIVE FAMILY NAMES FOR HEAVY-DUTY VEHICLES

FORM FOR HEAVY DUTY EVAPORATIVE VEHICLES

The proposed ef code for HDEV's are formatted as follows:

First character	Model year (see Table 1).
Characters 2 and 3	Letter code describing manufacturer (see Table 2).
Characters 4, 5, 6, and 7	Maximum fuel tank capacity in gallons or liters (to nearest tenth of a gallon or half liter).
Character 8	Letter code describing gallons (G) or liters (L).

Character 9	Letter code describing type of evaporative vapor storage (see Table 3).
Character 10	Letter code to make first 10 digits unique.
Character 11	Check sum digit

Example--A 1985 Evaporative emission family might be designated as:

FHC049.3GAA8

F = MY 1985

HC = International Harvester

049.3 = 49.3
G = Gallons

A = Canister

A = Uniqueness digit

8 = Check sum digit (Method of determining CSD is at back of paper)

TABLE 1. PROPOSED SUBCODES FOR MODEL YEAR

YEAR	CODE
1980	A
1981	B
1982	C
1983	D
1984	E
1985	F
1986	G
1987	H
1988	J
1989	K
1990	L
1991	M
1992	N
1993	P
1984	R

1995	S
1996	T
1997	V
1998	W
1999	X
2000	Y
2001	1
2002	2
2003	3
2004	4
2005	5
2006	6
2007	7
2008	8
2009	9
2010	A
2011	B
2012	C

TABLE 2. PROPOSED SUBCODES FOR MANUFACTURERS OF HDEV'S

Code	Manufacturer
BB	Bluebird Body Co.
CC	Chrysler Corporation
FM	Ford Motor Company
GM	General Motors Corporation
HC	International Harvester Company
RC	Revcon Incorporated

TABLE 3. SUBCODE FOR TYPE OF EVAPORATIVE VAPOR STORAGE

CODE	VAPOR STORAGE
A	Canister
B	Crankcase
C	Air Cleaner

D	Canister and Crankcase
E	Canister and Air Cleaner
F	Crankcase and Air Cleaner
G	Canister, Crankcase, and Air Cleaner
z	Other

STANDARDIZED HEAVY-DUTY EVAPORATIVE EMISSION FAMILY NAMES

F	H	C	0	4	9 . 3	G	A	A	8
Model Year	Manufacturer		Tank Size			Gallon or Liters	Type of Vapor Storage	Unique-ness	Check Sum
Digit	Digit								

Check-Sum Digit (CSD)

A check-sum digit is used in codes as a means of checking that the characters entered are correct. For example, in university courses, the registration code for Math 321 Section 4 might be 456-321-4-5 (Math). The 5 is tacked on the end so that the sum of all the digits is evenly divisible by some arbitrary number, in this case 10 (i.e., 4 + 5 + 6 + 3 + 2 + 1 + 4 + 5 = 30, which is divisible by 10). Thus a transcription error such as 466-321-4-5 would be flagged by a computer program. If the codes are alpha-numeric, then a computer program will also have to convert the alphabetical characters to numerical values.

Error checking with a CSD can be made more effective if different weights are applied to the characters. For example, Character 1 might be multiplied by 9, character 2 by 8, and so forth. The CSD would be determined by adding the products and then dividing by some arbitrary number. This method would help catch transposition errors that would not be detected by the straight sum method. In the example shown, if the number were entered as 456-312-4-5 (the 1 and 2 being switched), and the digits were added separately, the computer would accept it since the sum is still equal to 30. However, if the characters were weighted, the sums would be different if two characters were switched.

Method of Determining CSD

Step 1. Assign to each number in the ef code its actual mathematical value and assign to each letter the value specified below:

A = 1	J = 1	T = 3
B = 2	K = 2	U = 4
C = 3	L = 3	V = 5
D = 4	M = 4	W = 6
E = 5	N = 5	X = 7
F = 6	P = 7	Y = 8
G = 7	R = 9	Z = 9
H = 8	S -2	decimal pt = 1

Step 2. Multiply the assigned value for each character in the ef code by the weight factor specified for it below:

	Weight Factor
1st	10
2nd	9
3rd	8
4th	7
5th	6
6th	5
7th	4
8th	3
9th	2
10th	1

Step 3. Add the resulting products and divide the total by 11. The remainder is the CSD. If the remainder is 10, the CSD is X.

Example 1: HDEV -Determine the CSD if the first 10 characters are FHC049.3GAA.

	F	H	C	0	4	9	3	G	A	A
Assigned Value	6	8	3	0	4	9	3	7	1	1
Weighted Value	10	9	8	7	6	5	4	3	2	1
Products	60	72	24	0	24	45	12	21	2	1

Sum of Products = 261
Divide by 11 = 23 T 8/11
CSD = 8

Therefore, ef code is FHC049.3GAA8

HEAVY-DUTY EVAPORATIVE EMISSION CERTIFICATION INFORMATION SHEET

FAMILY INFORMATION

CORPORATE NAME (MFR): . . . . ./
EVAPORATIVE FAMILY NAME . . . ./ 7 / / _/ | / / / /
MODEL YEAR: . . . . . r r r

FAMILY SALES: . . . . . r / _/ / / _/
VEHICLE MODELS COVERED:*. . . .[

METHOD OF VAPOR STORAGE*: .[

EVAPORATIVE INFORMATION

EVAP. CNTRL SYS:. . . . . /
GVWR FOR SYSTEM . . . . ./ 7 7 _/ 7 7 -/_ / _ r r / _/ / 7 7 _/ 7 ~ -/ _i
_/ _/ _/ _/

	Max	Min		Max	Min
DETERIORATION FACTORS:. / | . ~ ~			/ ~ .		/

* Separate each model or method of vapor storage with a semicolon(;).

Evaporative Family/Engine Family Comparison

Evaporative Family

EVAPORATIVE FAMILY		ENGINE FAMILY	
Control System Code	Manufacturer	Family	Control System Code

Part Numbers	Evap. Code	Evap. Code	Evap. Code
Carburetor assembly part number			
Air Cleaner			
Evaporative emission canister part number (if applicable)			
Auxiliary emission control devices - identification (color, production code, number, etc.) of calibrated components			
Other major evaporative emission control system--part number(s) of calibrated component(s)			
Emission control related warning system--part number(s) of calibrated components(s)			